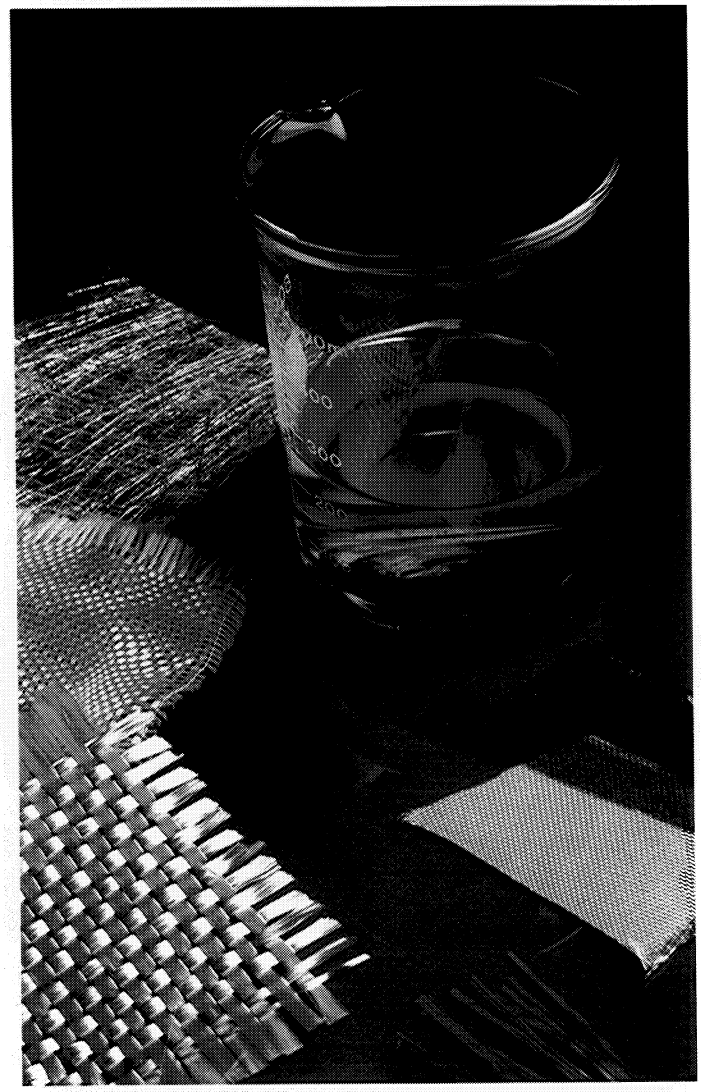
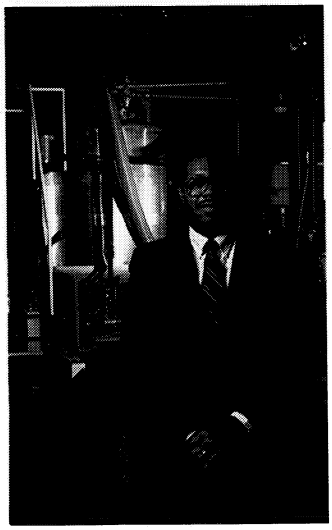
Composite Materials



Composite materials, such as those used in a widening range of aerospace and other industrial applications, are made up of two key components: fibers to reinforce the strength of the material, and matrix resins (polymers) to hold the fibers together and provide protection. At right is a photo study of a representative group of fibers used in composites and a beaker of a binding material.

At Langley Research Center, researchers invented an advanced type of polymer, a chemical compound formed by uniting many small molecules to create a complex molecule with different chemical properties. The material is a thermoplastic polyimide that resists solvents; other polymers of this generic type are soluble in solvents, thus cannot be used in applications where solvents are present because the solvents could damage components fabricated from such materials. Generally, the Langley development of the solvent-resistant material created a new polymer with the desirable properties of two major classes of polymers, thus broadening its industrial applications, which include molding resins, adhesives and matrix resins for fiber-reinforced composites.

The technology is being commercialized through NASA licenses to several companies, one of which is High Technology Services, Inc. (HTS), Techimer Materials Division, Troy, New York. HTS was founded in 1983 by Milton L. Evans, who had spent 20 years with General Electric Company in scientific, marketing and general management posts; Evans, president of HTS, is shown below next to the processing facility for preparing production batches of thermoplastic polyimides.



HTS is engaged in development and manufacture of high performance plastics, resins and composite materials. Techimer Materials Division sells composite matrix resins that offer heat resistance and protection from radiation, electrical and chemical degradation. The division's core product line utilizes thermoplastic polyimides based on the technology developed at Langley Research Center; HTS has licenses for five NASA patents and has introduced several products based on that technology. The company is actively marketing matrix resins for composites used in aircraft and laminating resins for composites used in printed board circuitry. Techimer is also offering resins as adhesives for flexible circuitry and aerospace structural uses. ▲